GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Electrical engineering in transport, PG_00058350		
Field of study	Hydrogen Technologies and Electromobility		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Electrified Transportation -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Leszek Jarzębowicz	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	0.0	0.0	45

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	45	6.0	24.0	75

Subject objectives

Gaining knowledge about the issues of electric traction and electrified transportation systems. Acquiring the ability to solve basic tasks and problems related to electric traction infrastructure and vehicles.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] knows the construction and operation of transformers, electronic circuits, electrical machines, low and high temperature electrolysers, electrical drive systems, their modeling and industrial applications; knows the principles of the processing, use and rational use of electricity, including the principles of electric traction in various transport systems,knows the hazards from electrical equipment		
[K6_U04] can apply the learned methods to the analysis and design of electrical elements, devices and systems	Student is able to calculate the principal operational parameters of electric vehicles and power supply infrastructure.	[SU1] Assessment of task fulfilment

Subject contents

Course content – lecture
Definitions. History of electric traction. Vehicle classification and specific parameters. Equation of motion. Vehicle movement resistance. Vehicles' electric drives. Tractive force characteristics. Electric vehicles. Electrified transportation systems. Motion phases. Shaping the speed profile. Motion dynamics. 3 kV-DC railway traction power supply system. Other railway traction power supply systems. Urban traction supply systems. Catenary. Traction substations. Section cabins. Traction supply control systems. Current collectors (pantographs). Diagnostics of current collectors. Electric vehicles' braking systems. Energy consumption. Energy storages.

Prerequisites and co-requisites

Basic knowledge of physics and electrical machines, and the ability to solve simple electrical circuits.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Raports and preparation for laboratory	60.0%	30.0%
	Lecture part tests	60.0%	70.0%
Recommended reading	Basic literature	Karwowski K. (red.): Energetyka transportu zelektryfikowanego. Poradnik inżyniera. Wyd. PG, 2020. Karwowski K. (red.): Energetyka transportu zelektryfikowanego. Zbiór zadań problemowych. Wyd. PG, 2023. Szeląg A.: Trakcja elektryczna - podstawy. Oficyna Wydawnicza Politechniki Warszawskiej, 2019. Szeląg A., Drążek Z., Maciołek T.: Elektroenergetyka miejskiej trakcji elektrycznej. Radom: INW Spatium, 2017. Skibicki J.: Pojazdy elektryczne. Część 1. Wydawnictwo PG, 2010. Skibicki J.: Pojazdy elektryczne. Część 2. Wydawnictwo PG, 2012. Chrabąszcz I., Prusak J., Drapik S.: Trakcja elektryczna prądu stałego. Układy zasilania. Podręcznik INPE dla elektryków praca zb. pod red. J. Strojnego. Zeszyt 27. Warszawa: SEP-COSiW, 2009. Głowacki K., Onderka E.: Sieci trakcyjne. Bibice: EMTRAK 2002.	
	Supplementary literature	Steimel A.: Electric Traction Motive Power and Energy Supply. Basic and Practical Experience. Munich: Oldenbourg Industrieverlag, 2008. Ehsani M., Gao Y., Longo S., Ebrahimi K.: Modern Electric, Hybrid Electric, and Fuel Cell Vehicles. 3rd Edition. CRC Press, 2018. Hayes J.G., Goodarzi G.A.: Electric Powertrain. Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles. Wiley 2018. Giętkowski Z., Karwowski K., Mizan M.: Diagnostyka sieci trakcyjnej. Wydawnictwo PG, 2009.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Present the main parameters and features of various railway power supply systems used in Europe.Discuss what determines the dynamics of vehicle motion.		
Practical activites within the subject	Not applicable		

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